

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 64-015602

(43)Date of publication of application : 19.01.1989

(51)Int.Cl.

G01B 7/34

(21)Application number : 62-170942

(71)Applicant : HITACHI LTD

(22)Date of filing : 10.07.1987

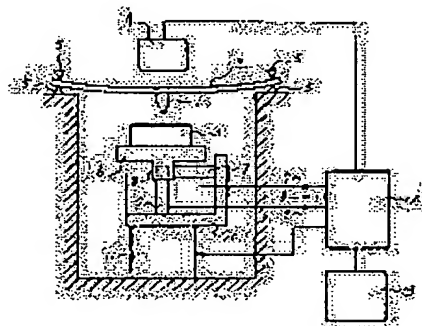
(72)Inventor : HOSAKA SUMIO  
HOSOKI SHIGEYUKI  
TAKADA KEIJI

## (54) MEASURING APPARATUS FOR FORCE OF MINUTE PART AND MEASURING APPARATUS FOR SHAPE

## (57)Abstract:

PURPOSE: To detect a force of a minute part with high precision by fixing both ends of a beam, by setting a probe in the central part thereof and also by using a non-contact displacement measuring means having a large measuring area.

CONSTITUTION: When a sample 3 is brought as close as about several angstroms to a probe 1 by a rough motion mechanism 11, a force acts between the nearest surface atoms of the probe and the sample, so as to cause the displacement of a beam 2, which is detected by a non-contact displacement measuring means. A Z-axis piezo element 9 is driven by a control unit 12 so that this displacement may be fixed, and thereby a gap between the probe 1 and the sample 3 is kept fixed. When two-dimensional scanning is conducted by X-axis and Y-axis piezo elements 7 and 8 while the above state is maintained, the Z-axis piezo element shows a change on the basis of the shape of the surface of the sample 3, the three-dimensional shape of the surface of the sample is obtained therefrom, and the minute structure thereof can be displayed in a display unit 13. In this way, the beam 2 supported both ends has a freedom in the axial direction of the probe 1, and a motion such as torsion can be prevented.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision  
of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office